

## 1. Introduction

This report summarizes air quality trends for ambient monitoring data collected in North Carolina from 1972 to 1995 by the N. C. Division of Air Quality in the Department of Environment and Natural Resources. The pollutants discussed in this report include: particulate matter (TSP and  $PM_{10}$ ), carbon monoxide (CO), ozone ( $O_3$ ), sulfur dioxide ( $SO_2$ ), nitrogen dioxide ( $NO_2$ ), and lead (Pb). These compounds are referred to as criteria air pollutants because the federal and state governments have established standards for them to protect the public health and the environment. This report also covers the concentration of hydrogen ions in precipitation, which refers to one measure of acid rain or deposition, expressed as pH. The pH of rainfall has been sampled in North Carolina since 1978 by the National Atmospheric Deposition Program/National Trends Network (NADP/NTN).

Chapter 2 lists the federal and state standards for criteria air pollutants. Chapter 3 shows the location of sites in the North Carolina air monitoring network as of 1995. Chapter 4 provides a concise summary of the statistical trends for all of the pollutants, including acid deposition.

Chapters 5 through 11 contain descriptions and discussions for each pollutant. Each chapter identifies and describes a pollutant and then discusses the important sources, meteorological interactions, applicable federal and state standards, and health, welfare or environmental effects. Chapters 5 through 11 also contain graphical summaries of the statewide performance for each pollutant relative to its standards. Most of these graphs contain a boxplot for each year of data, showing the median, quartiles, minimum and maximum statistics for a concentration measurement relating to one of the standards. We superimpose a smoothed trend line through the boxplots. After the graphical summary, the trends for each pollutant are discussed.

Carbon monoxide and ozone have exceeded the standards numerous times, which has prompted the EPA to designate portions of North Carolina in nonattainment of the standards during certain periods. Currently, all areas of the state meet the ozone and carbon monoxide standards. For these two pollutants, we have provided a barplot showing the actual numbers of exceedances in each year. In 1997, the EPA adopted a new, stricter standard for ozone, which is likely to be much more difficult to meet than the old standard.